



## HSL / UMIST JOINT OIL & GAS TESTING FACILITY AT BUXTON DERBYSHIRE



### Rationale, aims and objectives

Most oil companies (BP Amoco, Shell, Exxon, etc.) are scaling down their test facilities and capability in the US and in Europe (e.g. closure of Amoco Tulsa Laboratory in the US, scaling down of BP Sunbury and Shell facilities in the UK). Instead they are relying increasingly on outsourcing R&D and testing services and expertise. The engineering contractors have similarly downsized with only one contractor in the UK having retained significant experimental facilities for development work.

At the time when the technology is being pushed to its limit to increase production, reduce costs (both OPEX & CAPEX) and to operate with minimum human supervision (de-manning, minimum facilities) and in increasingly remote places (subsea), tests facilities available for process engineering work, especially in the UK, are disappearing, as is the expertise necessary to develop and operate them.

Sometimes experimental facilities, such as on university campuses are limited by safety regulations which preclude the use of live hydrocarbons on scales relevant to process studies and limit the volumes of product and pressures used. The experimental facility at HSL Buxton however will enable the joint HSL / UMIST team to carry out research and development work with flammable liquids and gases in real systems and under realistic conditions.

Although the initial focus of the work undertaken in the Facility will be in the oil and gas field, other sectors such as pharmaceuticals, fine chemicals, environmental technologies, water industry could also be potential customers.

### Details of available equipment

Items donated to UMIST from BP Amoco's Tulsa laboratory will form the core of the facility: The facility will initially consist of a liquid / liquid flow loop which will be associated with a number of self contained separation equipment skids and instrumentation packages as required. A gas / liquid flow loop will be developed later. The facility would be readily configured to support the work in a number of process areas which are highly relevant to safety and environmental assessment and to the needs of the industry.



The liquid / liquid flow loop comprises:

- Pumps
- Valves
- Sample joint mixers
- Homogeniser
- Instruments to support the test loop (including flow meters).



The separation equipment skids are:

- Disk stack centrifuge
- Hydrocyclone
- Cross flow membrane filter
- Adsorption filter



## **Work areas for the facility**

Once fully operational the facility will be self-supporting from resources derived from R&D and testing. In this context, HSL and UMIST have a solid track record in obtaining funding from a wide variety of public and private sources such as HSE, LINK (DTI), Research Councils and other sources of UK government funding, EU R&D frameworks, and industry (e.g. Joint Industry Projects).

In the future, there is likely to be more funding for inherent safety (lower inventories with potentially lower environmental impact) and improved control systems (prevention rather than mitigation). An issue in inherent safety is improvements in continuous separations technology. The facility would allow the systematic study of such technology.

The liquid / liquid and proposed gas / liquid flow could support work in a number of process areas of relevance to industrial needs and to the assessment of safety cases, and in particular:



- Oil/water separation
- Solid removal and handling e.g. separation of oil and mud
- Treatment of produced water
- Chemical removal
- Experimental validation of CFD models.
- Effect of pipeline geometry on liquid in gas dispersions
- Gas / liquid separation equipment design e.g. separation of mists from gas streams
- Effect of liquid droplets on high pressure gas flows
- Development and qualification of flame arrestors
- Non intrusive sensor development.

## **Contact details**

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